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ABSTRACT

It was hypothesized that behavior patterns, learned early in life and maintained by almost continuous reinforcement, are determined by basic physiology, which in this study is represented by the duration of postrotary nystagmus (involuntary eyeball movement following rotational stimulation). The Southern California Postrotary Nystagmus Test was administered by an occupational therapist to 30 children (ages 3 to 5 years) attending a community college lab school and their parents. Both groups' behaviors (words, tones, gestures, postures and facial expressions) were then observed by parent educators. Observed behaviors were categorized as "drivers", or slogans which constitute invitations to comply in order to feel loved (such as Hurry Up, Be Perfect, Please Me, Try Hard, and Be Strong). A correlation of .65 was found for the relation between driver behavior in children and duration of postrotary nystagmus. A hierarchy of types of driver behavior was identified. Eighty-six percent of the children were observed to have 'Please Me' driver behaviors. The correlation for parents was less marked (r=.28); 93% of the parents were observed to have 'Please Me' driver behaviors. These findings suggest that knowledge of how the individual processes information, as indicated by duration of nystagmus, is useful as an indicator of what behavioral invitations are likely to be accepted. Recommendations for further research are indicated. Appendices include charts and tables of data. (Author/SS)

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THE RELATIONSHIP BETWEEN DURATION OF POSTROTARY NYSTAGMUS AND DRIVER BEHAVIOR

ED176865

LEARNING THEORY MODULE

by

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JOINT PRACTICUM

This practicum was conducted jointly for the following reasons:

a. Research correlations were doubled. With two different populations, findings were more closely analyzed and understanding of relationships was enhanced.

b. Two different age groups warranted separate analyses. Collection of data, treatment of data and analysis of data were separated for the two groups.

c. Two different perceptions increased the validity of subjective analyses.

Each participant contributed jointly to each section of the practicum. However, research populations, data treatments and analyses were separate after the Drivers in both groups had been jointly classified. Sue Geier obtained data on a population of 30 preschool children (ages 3-5) and Barbara Young obtained data on 30 parents of preschoolers. Independent analyses of these two groups was viewed as critical evidence in establishing the validity of basic physiology as a determinant for psychological behavior patterns.

JOINT PRACTICUM

INDIVIDUAL SUMMARY STATEMENT

Data was obtained and analyzed for two groups of subjects from different populations. The opportunity to observe in detail (e.g. words, tones, gestures, postures and facial expressions) the influence of parental/adult interaction was rewarding and sobering. The child's own physiology appears to direct his response options - the primary one being a desire to please. I have utmost respect for children and their developmental tasks. Recognition of the relationship between body processing and response patterns has enhanced my appreciation for this complex process and given me a tool to clarify behavioral dynamics and intervene more effectively.

In my role as a Parent Educator, I have increased effectiveness in teaching and modeling for parents ways to communicate with children. I have gained valuable information to share with them toward the goal of strengthening family relationships. In my role as Instructor of Child Development, I have advanced my professional knowledge and understanding of significant processes in establishing and maintaining behavior patterns. My ability to interpret and communicate with students has been enhanced.

Sue Geier

JOINT PRACTICUM

INDIVIDUAL SUMMARY STATEMENT

This practicum increased my knowledge of the effect of physioogy on behavior. It increased my understanding of Lab School parent-child interactions and provided suggestions for possible interventions. It identified the need for further research to determine if the sample of Lab School parents is accurate- in terms of an over-adapting population. If so methods need to be devised to reach out to the unserved or underserved segment of the community.

As Coordinator of Parent and Early Childhood Education, it provided knowledge to be shared with Parent Educators during in-service training. It increased my interpersonal skills in dealing with professionals and parents. It provided an opportunity to evaluate another dimension of the parent education program.

Barbara Young

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ABSTRACT

Title: The Relationship Between Duration of Postrotary Nystagmus and Driver Behavior.

Problem: It was hypothesized that behavior patterns, learned early in life and maintained by almost continuous reinforcement, are determined by basic physiology, in this study, represented by the duration of postrotary nystagmus.

Procedure: 30 children and 30 parents, randomly selected from the Brevard Community College Laboratory schools, were administered the Southern California Postrotary Nystagmus Test by an occupational therapist. Both groups were then observed for behaviors (i.e. words, tones, gestures, postures, and facial expressions) by Parent Educators. These observations were then categorized into Drivers (i.e. behavior patterns) by the two researchers and confirmed by Kahler, author of the Driver theory. Linear regressions and t-tests for significance were performed.

Findings: Children: a correlation of .65 indicated a marked relationship between Driver and postrotary nystagmus. A test indicated the relationship was significant at the .001 level for a 2-tailed test. A Driver hierarchy was identified. Twenty-six of thirty children were observed to have Please Me Drivers: explanations were discussed.

Parents: A correlation of .28 indicated a slight correlation. A t-test supported the significance of the relationship at the .10 level for a 1-tailed test. A Driver hierarchy was suggested. Twenty-eight of thirty parents were observed to have Please Me Drivers: explanations were discussed.

Recommendations: Children: 1) it was recommended that further standardization of data was needed on the SCPNT to include a wider age range; 2) the frequency of Please Me Drivers should be verified by further research; 3) the marked relationship between postrotary nystagmus and Drivers be verified by further research; and 4) recognition of this relationship can be effectively used by parents and others to enhance behavior.

Parents: 1) methods for investigating researcher bias were suggested; 2) further research on the SCPNT is needed; and, 3) further research is needed to determine the relationship between postrotary nystagmus and Drivers.

INTRODUCTION

According to Transactional Analysis (TA), each human being, early in life, makes decisions around who he/she is and how to survive. He/she decides what behavior is necessary for survival and whether that behavior makes him/her OK or not-OK according to nuturing people around, generally mother and father. From these decisions, lifelong behavior patterns are established.

In the past, heredity was thought to be the determinant of behavior. More recent study focused on environment as the determinant of behavior; postulating that all behavior, except reflexes, is learned. In reality, there is a profound interrelationship between physiology and phychological behavior patterns.

It was hypothesized that the beginning behavior patterns are determined by the physiology of the central nervous system, in this case represented by the vestibular system.

The function of the vestibular system is to maintain the desired position of the body in space. Hence, it is part of the basic physiology of the human body. Each body's sensory processing system, of which the vestibular system is one part, is unique. Each vestibular system permits specific sensations to be received or inhibited. From this input, each body makes decisions about the behavior that is necessary for survival.

At birth, each baby has his/her own unique way of reacting both to internal and external stimuli. The parent of the infant decides whether that behavior is acceptable OK behavior or not-OK behavior.

The parent then sends messages to the child inviting specific behavior in order for the child to feel loved (i.e., Drivers: Please Me, Try Hard, Be Perfect, Hurry Up, and Be Strong).[1] It is hypothesized that the child's physiology determines whether the body can function as requested. If the child cannot fulfill the request, the child feels unloved and the parent feels inadequate or angry. From these early interactions, a healthy or unhealthy parent-child relationship is established.

Parent Educators(PE) in Brevard Community College (BCC) Lab Schools have observed many times the phenomonen of a parent expecting his/her child to experience the world as he/she does, and rejecting and feeling rejected when the child does not. Since the focus of the BCC Lab School program is prevention of negative parent-child relationships, the increased understanding of the effects of physiology on behavior is vital.

The purpose of this research was to determine the relationship between the duration of postrotary nystagmus and Driver behavior. A sample of thirty randomly chosen parents and thirty children in BCC Lab Schools were given the Southern California Postrotary Nystagmus Test (SCPNT) and asked to draw a picture of themselves while their behavior was observed and described by Parent Educators (PE).

[1]The concept of Drivers (i.e., invitations to respond issued by caregivers to children) and their influence on behavior was identified by Kahler in his miniscript theory (TA Journal, Jan. 1974). Drivers are capitalized for easy identification.

Scores were translated using the SCPNT data in standard deviation equivalents for curation of nystagmus. Behavioral descriptors were analyzed and categorized for Drivers. Kahler confirmed the analysis of Driver behavior.

A linear regression analysis between vestibular processing and Driver behaviors was used to establish the degree of relationship between physiology and phychological behavior patterns.

BACKGROUND & SIGNIFICANCE

The learning theory module allowed the researchers an opportunity to investigate the role of physiology on learning.

Learning has been described as a process of change in behavior brought about through experience (Ripple, 1978). Learning theory was identified as being consistent with three theoretical viewpoints: intersensory processing, behavioral, and cognitive--at difference levels of brain function (Geier, 1978). Each learning experience is a function of sensory integration. "It is the task of the central nervous system (CNS) to filter, organize and integrate information so that it might be used for the development and execution of the brain's function. One of these functions is learning" (Ayres, 1974). Behavioral learning theory identifies reinforcement as the mechanism for maintaining behavior. (Skinner, 1953; Bijou & Baer, 1965). Once a behavior has been included in the repertoire, reinforcement maintains it. Behavior that is not reinforced disappears. An individual may or may not be aware of the reinforcing mechanism. Cognitive learning refers to the process of interpreting or perceiving a sensory event. Perceptions are organized or coordinated into a whole (Lewin, 1954). Cognitive learning involves integration of the highest brain centers. The information that the cortex receives is dependent upon the integrity of the lower levels. In summary, behavior patterns which are a function of intersensory processing and perceptions are learned early in life and are maintained by reinforcement.

There has been a growing interest in the relationship between the vestibular system and many aspects of human behavior (Prescott,

1969; Ayres, 1974; Stilwell et al, 1978). Nystagmus, an involuntary rapid, back and forth movement of the eyeball, results from stimulation of the vestibular system. Duration of nystagmus following rotational stimulation has long been used to evaluate the function of the vestibular system (Ritvo, Eviatar, & Brown, 1969). Bender (1956) and Ornitz & Ritvo (1968) found that autistic and schizophrenic children had significantly lower nystagmus responses than did normal children. Stilwell, Crowe & McCallum (1978) found that depressed nystagmus scores were associated with disorders in articulation, speech and language. Levinson and Frank (1978) reported that dyslexic patients frequently had cerebellar-vestibular disorders.

Nystagmus following rotation is a normal adaptive response designed to reestablish the original fixation on a visual field. It is hypothesized that a certain amount of cortical inhibition of response to vestibular input is necessary to maintain spatial orientation (Dowd & Cramer, 1971). However, significantly reduced nystagmus would suggest reduced adaptive capacity and severely reduced nystagmus may be interpreted as over-inhibition of one or more of the vestibular nuclei, and that other neural processes may be poorly inhibited. It is logical to assume that other aspects of the brain are also dysfunctioning because of excessive or reduced inhibition of vestibular input. Ayres (1975, p.2) published standardized data on school age children that "provides a standard procedure for measuring and comparing against normal expectations one of the more common types of non-pathological nystagmus".

The vestibular system appears to be a unifying system for all the sensory systems and has rich connections throughout the CNS.

The brain stem, including its upper end, the thalamus, is a

locale for some of the brain's most significant and comprehensive sensory integration. The reticular formation area in the brain stem and thalamus receives sensory input from every sensory modality (Ayres, 1974). French (1960) has referred to it as the master control mechanism in the CNS. This capacity for intersensory integration may be a major source of man's adaptive capacity.

The most commonly reported modalities showing convergence are visual, auditory, olfactory, vestibular and somesthetic. Ayres (1974) proposed that the sensory systems do not develop independently and, further suggested that visual perception and auditory processing are to a certain extent dependent upon processing of stimuli from the tactile and vestibular systems. The effect of convergence of vestibular stimuli with somatesensory and visual input and its subsequent relationship to posture, coordination and visual perception have been suggested (DeQuiros, 1966; Levinson, 1973; Rapin, 1974). Ayres (1974) believes that the vestibular system not only influences the processing of auditory stimuli through convergence, but also through facilitating optimal synaptic transmission, which in turn increases the speed and efficiency of neural processing.

The following description of the vestibular system by Kornhuber (1974) emphasizes its significance to the CNS:

> "The vestibular system is a sensory system with access to the cerebral cortex, conscious perception and memory. It is also a motor system that regulates body posture and eye position. Vision and audition are telesenses, receiving information about distant events. Vestibular sensation belongs to proprioception and tells us about position and motion of our body. Touch tells us about changes on our skin and explores the surface and shape of tactile objects...Vision is interested in location, in motion within the visual field and in the orientation of lines and patterns of figures. The vestibular system is less sophisticated, but in one respect it is more basic.

> It tells vision what is up and down. Peripheral vision (a function of the vestibular system) is strong in detecting changes in motion and brightness, in static and dynamic spatial orientation and even in transmission of information about size line orientation and figures.
>
> The vestibular system is important in somatic proprioception. The receptors in the neck work in conjunction with receptors in the head to maintain equilibrium. The coordination of vestibular and deep somatic afferents occurs through the vestibular system from the vestibular nuclei via the thalamus up to the vestibular sensory and motor cortical areas. In contrast to the poor sensory representation of eye movements, vestibular sensation of head or body movements is strongly represented in conscious experience and has access not only to the motor cortex but also to the posterior parietal region in which messages from all senses converge and form a unified image of the spatial situation."

Prescott (1969) in describing the functional relationships between the cerebellar and limbic system structures and the known projections from cerebellum to reticular structures, proposed a major role for the cerebellum in emotional processes.

Transaction Analysis is an effective tool for explaining emotional development. This theory of personality views behavior as being divided into two general categories: OK and not-OK (Berne, 1972). The chief tool for moving from not-OK to OK behavior is awareness. Awareness of current experiences, influencing variables and choices increase autonomy or the ability to decide what option one will choose. Lack of awareness and options reduce behavior to being a function of past decisions. Through awareness on cognitive level learning, one can change reinforcement and behavior.

Taibi Kahler (1974), in his miniscript theory of TA, views not-OK sequences of behavior as beginning developmentally with an invitation called a Driver from parents and/or significant others. Drivers are slogans (i.e., Hurry Up, Be Perfect, Please Me, Try Hard and Be Strong). The invitation is to behave in compliance with the slogan in order to feel loved. The child decides to

act in compliance with the slogan and feel loved or fail to meet the expectation and feel unloved. Not-OK behavior is maintained through the reinforcing process of acting out Drivers second-by-second. An individual spends approximately ninety-five percent of his time in Driver behaviors.

Driver behaviors are manifested in words, tones, gestures, postures and facial expressions. Each person manifests one or more Drivers depending upon the investment he/she has in complying with that particular invitation.

The relationship between postrotary nystagmus and Driver behavior is viewed as the relationship between intersensory processing, or basic physiology, and learned behavior. It is hypothesized that one's intersensory processing system determines what Driver one will adopt. Behavior patterns are a result of basic physiology. Behavior patterns are invited by the environment. The invitation accepted depends upon unique physiology of the individual. The individual maintains the behavior by almost continuous reinforcement.

In summary, a review of the literature supported the hypothesis that physiology effects learning.

Prescott (1967; 1969) considered the relationship between sensory deprivation during early development and later behavior disorders. The researchers considered the relationship between sensory processing and behavior patterns in two normal groups - preschool children and parents. Duration of nystagmus using the procedure described in the SCPNT was selected as a measure of sensory processing and Driver behaviors as described by Kahler (1974) in his miniscript theory was chosen as a measure of behavior patterns.

This study investigated the relationship between three different levels of learning (i.e., automatic or physiological, cognitive or

conscious and the maintenance of behavior by reinforcement using children) and parents who were enrolled in BCC's parent education program. Increased knowledge about behavior patterns and parent-child relationships is vital to the effective functioning of the Lab School Program.

Population

Parents (N=263) and children (N=138) enrolled in Brevard Community College (BCC) Schools during the second term of the 1977-78 school year comprised the research population.

Sample

The sample populations were comprised of 30 parents and 30 three-to-five year olds. Membership in this group was determined by those parents and children who were in attendance on the day that the Occupational Therapist (O.T.) arrived to give the test.

Method of Data Collection

Two types of data were collected from the two sample populations.

(1) Thirty parents and thirty children were administered the standardized Southern California Test of Postrotary Nystagmus (SCPNT, See Appendix A) by an occupational therapist. The examiner sat to the side of the nystagmus board. The client was seated on the nystagmus board with legs crossed Indian style. The client's weight was balanced centrally with both hands grasping the edge of the board in front of them at midline. To get minimal stimulation of the horizontal semicircular canals, the subject's head was passively placed at 30 degrees of ventroflection. The subject was asked to hold his/her head in place during rotation and to look forward at a blank wall when rotation ceases. The test consisted of two rotations - each lasting 20 seconds. On the first rotation subjects were rotated to the

left, and on the second, to the right. A one minute rest period was introduced between rotations. To measure postrotary nystagmus, a stop watch was started when the board came to rest, and stopped when visible nystagmus ceased in both eyes.

(2) The same thirty parents and thirty children were observed for Driver behaviors by one of four Parent Educators. Each subject was invited by a Parent Educator into the Learning Center at a Lab School and asked to draw a picture of self using a pencil and sheet of plain paper. As the subject performed this task for five minutes, his/her behavior was described by the Parent Educator on a grid (see Appendix B).

Treatment of Data

Left and right scores were summed and the combined score used as the postrotary score. The combined score was translated into a standard deviation score equivalent (see Appendix C). Three general categories of under (-1.1 S.D. and below), normal (-1.1 S.D. to +1.1 S.D.) and over (+1.1 S.D. and above) were reported in a table of figures.

Behavioral descriptors were analyzed and categorized according to descriptions listed in a Driver Behavior chart (see Appendix D). The categorizations were confirmed by Taibi Kahler. Driver behaviors for both groups were reported in Tables 1 and 2 (see Appendices E and F).

The relationship between the three categories of vestibular processing and Driver behaviors was determined using a regression analysis. Driver behaviors were plotted on the X-axis and the nystagmus categories of under, normal and over processing were plotted on the Y-axis.

Assumptions of the Study

The following assumptions were basic to this proposal. The task of the CNS is to filter, organize and integrate information so that it might be used for the development and execution of the brain's function. One of these functions is learning. The CNS of each individual is unique. Behavior patterns are established early in life and are a function of the individual's unique intersensory processing system, and how that system interprets information from the environment. Gross reflections of CNS processing are observable. Driver behaviors represent a pragmatic method of describing CNS processing. Driver behavior and vestibular processing do not change with age. Knowledge base and consequent adaptations change with experience, but basic learning style is based on physiology and does not change.

Limitations of the Study

The SCPNT is a gross measure of vestibular functioning. Visual fixation and optokinetic nystagmus during rotation may influence the duration time. More exact measurements such as caloric stimulation and electrically monitored responses are available and would reflect discriminate vestibular functioning. A visual measure of nystagmus such as movement observed by the occupational therapist and a respondent depression of the stopwatch stem incorporated such artifacts as the level of visual discrimination and the reflex time of the occupational therapist.

Observations by the Parent Educators were limited by their abilities to observe and record behaviors. An obvious solution to this limitation would be video-taping. However, associated logistical complications negated the value of using this more precise record of behaviors.

BCC Lab Schools - Seven schools located throughout Brevard County are sponsored by the Life Education Program of Brevard Community College. In these schools, parents are offered opportunity to improve their parenting skills and children from birth to six are provided an environment designed to develop maximum potential including physical, emotional, social and intellectual.

Drivers - Drivers are messages that are delivered from the not-OK part of the Nurturing Parent to the not-OK part of the Adaptive Child. These messages advise the child how to "make it" in life. There are five slogans or messages: Be Perfect, Try Hard, Please Me, Be Strong, Hurry Up. The child interprets these messages as meaning that he/she will be okay if he/she lives out the slogan. For example, Little Johnny hears Dad say many times, "Johnny, to get ahead in this world, you've got to try a little harder. If you want to get anywhere, you can't spare the elbow grease. Work a little harder. Get there before the other fellow." Johnny grows up thinking that he is okay if he is trying harder. When he feels okay about himself, he does not hear this message in his head. When he feels not-OK, he replays the Try Hard tape and manifests Try Hard behaviors.

Drivers Behaviors - See Appendix D descriptors associated with the five Drivers. These behaviors reinforce the Drivers and maintain life script patterns.

Intersensory Processing System - Under the direction of the CNS, sensory information is filtered, organized and integrated through four processes: intersensory integration, centrifugal influence, modification

through feedback and balancing of excitatory and depressant neural activity. These functions are not neurologically independent. Through intersensory integration, one sense can ultimately provide information about another without direct stimulation.

Learning Center - This is a small area, usually a corner of the Perception Room, that is set off from the rest of the room by a divider. A small table and two chairs provide an oasis where the teacher and one child can enjoy the special qualities of a one-to-one learning experience.

Miniscript - The miniscript is a transactional analysis theory originated by Kahler. It is a sequence of behavior that results in a reinforcement pattern of life. It occurs in a matter of minutes or seconds. The miniscript may be OK or Not-OK. Drivers reinforce a Not-OK miniscript.

Nystagmus - This is an involuntary, rapid, back and forth movement of the eyeballs.

Parent Educator _ A Parent Educator (PE) has a master's degree in psychology, social work or counseling. Her job description includes evaluating children's developmental levels (i.e., motor, emotional, social and intellectual). She also counsels parents on psycho-social dynamics between parent and child, parent and parent, and the whole family unit. All PE's in this study are in training as clinical therapists with Kahler.

Occupational Therapist - Training in occupational therapy includes psychology, neurology, orthopedics and focuses on neuromotor development

with knowledge of sensory systems and how they are integrated by the nervous system. Registered occupational therapists are licensed by the State of Florida.

Perception Room - This is one room in each Lab School that houses perceptual materials such as puzzles, peg boards and pegs, wooden beads for stringing, etc. It is a quiet room, both auditorily and visually, where children may engage in visual motor tasks with a minimum of distractions.

Southern California Test of Postrotary Nystagmus (SCPNT)- The SCPNT is a standardized test developed by Jean Ayres, that provides a procedure for measuring and comparing against normal expectations one of the more common types of non-pathological nystagmus.

Vestibular Board - This is a piece of equipment designed to obtain data for the SCPNT. It is made of hard plastic, is approximately 24 inches square and swivels approximately 1/4 inch off the floor.

RESULTS - *Children*

Left and right scores of duration time were combined and used as the postrotary nystagmus score. The combined scores were translated into Standard Deviation Score Equivalents (SD) from the SCPNT and are reported in Appendix E. These SD's are presented below in three general categories of under, normal and over processing.

Table 1

Frequency - Nystagmus Duration for Children

Under		Normal				Over	
Age/MO	S.D.	Age/MO	S.D.	Age/MO	S.D.	Age/MO	S.D.
36	-1.3	36	-0.6	57	-0.6	40	+3.0
42	-1.8	40	-0.5	58	+0.3	40	+3.0
42	-2.1	42	+0.3	58	+0.9	43	+1.4
		48	-0.5	59	-0.2	45	+1.9
		48	+0.3	59	-0.8	45	+3.0
		50	-0.5	59	-1.0	48	+1.4
		50	+0.6	61	0	55	+1.4
		54	+0.8	64	-0.4	56	+1.6
		56	+0.3	68	+0.1	57	+1.6
N=3				N=18		N=9	

Avg. age: 40 mo. Avg. age: 53.6 Avg. age: 48

Behavioral Descriptors observed by the Parent Educators were analyzed according to the Driver Behavior Chart (see Appendix D). Kahler confirmed the categorizations while recognizing them as gross screening measures that were highly dependent upon observer bias. These data are reported in Appendix E. Driver behaviors by age groups are presented in Table 2.

Table 2

Driver Frequency by Age of Children

Age/MO	Try Hard	Please Me	Be Perfect	Hurry Up	Be Strong	Total (N)
36-42	2	2	0	2	2	8
43-48	3	1	2	0	0	6
49-54	1	1	1			3
55-64	1	6	2	2	1	12
Total (N)	7	10	5	4	3	29

A regression analysis was performed by plotting the nystagmus SD's on the Y axis and the Drivers on the X axis to determine the linear relationship. A regression formula of $y = .59 \times -1.29$ resulted in a correlation coefficient of .65 (see Appendix G). A t-test to determine whether the true correlation were zero proved to be significant at the .001 level for a two-tailed test (see Appendix I).

The average SD's for each Driver category are presented in Table 3.

Table 3

Hierarchy of Drivers for Children

Driver	Avg. SD
Try Hard	+1.41
Please Me	+0.78
Be Perfect	-0.32
Hurry Up	-0.34
Be Strong	-1.43

Driver order of the most frequently observed drivers were categorized and are presented below in Table 4.

Table 4

Frequency of Drivers for Children

Driver	Driver #1 (N)	Driver #2 (N)	Total (N)
Try Hard	7	1	8
Please Me	10	16	26
Be Perfect	6	4	10
Be Strong	3	0	3
Hurry Up	4	5	9
Total	30	26*	56

*4 S's had no 2nd driver

RESULTS - Parents

Left and right scores of duration time were combined and used as postrotary nystagmus score. Standard deviation score equivalents from SCPNT were obtained and are reported in Appendix F. These SD's are presented below in three general categories of under, normal and over processing.

Table 5

Frequency of Nystagmus Duration for Parents

UNDER		NORMAL		OVER			
Age	SD	Age	SD	Age	SD	Age	SD
		31	+1.0	29	+1.6	29	+3.0
		23	-0.8	31	+3.0	35	+3.0
		26	+0.8	41	+3.0	36	+3.0
		31	+1.0	29	+3.0	30	+3.0
		27	+0.5	44	+2.2	30	+2.6
		28	+0.2	32	+3.0	28	+3.0
		25	+1.0	30	+1.3	28	+2.9
		35	+0.3	33	+2.1	38	+3.0
		30.	0.0	36	+3.0	33	+3.0
		31	+0.2	. 22	+1.9	32	+1.4
N=0		N=10		N=20			

Behavioral descriptions observed by PE were analyzed according to Driver Behavior Chart (see Appendix F). Kahler confirmed categorization but recognized it as a gross screening measure highly dependent on the observer's biases. These data are reported in Table 6.

Table 6

Driver Frequency by Age for Parent

Age/Yrs	Try Hard	Please Me	Be Perfect	Hurry Up	Be Strong	Total (N)
20-29	5	5	0	1	0	11
30-39	9	5	2	1	0	17
40-49	0	2	0	0	0	2
Total (N)	14	12	2	2		30

A regression analysis was performed by plotting the nystagmus SD equivalent on y-axis and the Drivers on an x-axis to determine the linear relationship. A regression formula of y=.35 x +.72 resulted in a correlation coefficient of .28 (see Appendix H).

The average SD equivalents for each Driver category are presented in Table 7.

Table 7

Driver Hierarchy for Parents

Driver	Avg. SD
Try Hard	+2.08
Please Me	+1.77
Be Perfect	+1.5
Hurry Up	+1.5
Be Strong	none

Driver order of most frequently observed Drivers were categorized and are presented in Table 8.

Table 8

Frequency of Drivers for Parents

Driver	#1 (N)	#2 (N)	Total (N)
Try Hard	14	8	22
Please Me	12	16	28
Be Perfect	2	2	4
Hurry Up	2	-	2
Be Strong	0	3	3
Total (N)	30	29*	59

*One subject had no second Driver

DISCUSSION AND IMPLICATIONS - Children

The data indicate a marked relationship between duration of post-rotary nystagmus scores and Driver behaviors. This relationship is further supported by the hierarchy of Drivers obtained from the average SD's associated with Driver behaviors, as shown in Table 5. Further statistical analysis is needed to verify the strength of this hierarchy.

The categories of under -(-1.1 SD), normal -(-1.1 to +1.1 SD) and over - (+1.1 SD) processing are influenced by a standard error such that only scores exceeding $\pm$ 1.5 SD or $\pm$ 2.0 SD indicate deficit processing (Ayres, 1975). Ten percent of the group, all from the youngest age range, were represented in the under-processing category; 60% in the normal category; and, 30% in the over-processing category. Deficit processing was indicated by 27% of the scores. Twenty-six of the thirty children had Please Me as either the first or second most frequently observed Drivers (see Table 6). Several explanations may be considered.

Analysis of behaviors into Driver categories may be a projection of the two researchers. One's own behavior is reflected, or more quickly perceived, in the behavior of others. Burrow (1943) explained projection as a universal reaction that clutters the brain and impairs channels of communication. Here, the researchers may have interpreted the Driver behavior of the children through the bias of their own patterns.

A second explanation is that the Parent Educators who observed and described the behaviors were selectively biased. They may, again through the mechanism of projection, have been most aware of behaviors that were most familiar to them.

A third explanation, that seems most likely, is that the Please Me Driver represents an underlying wish to be loved and this desire

is converted into behaviors designed to win approval. An investment in the Please Me Driver is essential if the other Driver invitations are to be accepted since the basic premise for the Driver invitations is that I will love you if you. . . . The experimental task involved a request for compliance by an adult, the request may have been prefaced by a Please Me Driver invitation, and the response was a Please Me compliance from the child. Of the older age group, 50% was represented by the Please ME Driver as opposed to 25, 17 and 30% of the younger groups. It may be that the Please Me Driver becomes more selective and observable as a function of age and normal processing.

These findings suggest that knowledge of how the individual processes information, as indicated by duration of nystagmus, is useful as an indicator of what behavioral invitations are likely to be accepted. . . . Parents and others who work with young children can use this information to become more understanding of behavior and more effective in inviting positive patterns.

For example, the child who under-processes may be predicted to be slow in responding to the environment. If he is the child of an over-processor who moves at a much more rapid pace, the invitation may be to Hurry Up (that implies speed up or you won't be OK with me). Since the child cannot speed up, not-OK behavior patterns are likely to result. Or, the invitation may be Be Strong (that implies don't feel confused or abandoned, make up your mind and do something). Since the child feels confused by unrealistic expectations or abandoned because he cannot comply, he/she predictably will learn negative behavior patterns.

Another example is the child who shares an extreme over- or under-processing system in common with a parent. For this illustration, both parent and child are over-processors and will predictably over-adapt

(See researcher Young's comments). The child will be invited to Try Hard (that implies try a little harder to comply). This invitation will increase the information to be processed and intensify the lack of inhibition, - both parent and child will tend to go out of bounds behaviorally. Negative interaction is predicted, from which negative patterns will be learned. Because innate physiology is fairly consistent from day-to-day, repetitive interactions are predictable and reinforcement will serve to maintain the patterns.

These data have strong implications for parent-child relationships. Two corollaries are inferred. One, the greater the difference in nystagmus duration time between parent and child, the greater the probability of that parent pressuring the child to behave in a manner consistent with the parent's system. Two, the greater the similarity in extreme processing, the greater the probability that the parent will pressure the child to behave in a manner that is different from the parent's system. Both of these extreme physiological differences have a high probability of fostering negative behavior patterns and associated negative self-concepts.

In summary, the data reflect a marked relationship between duration of nystagmus and Driver behaviors which supports the proposed role of the cerebellum in emotional processes suggested by Prescott (1969). Further evidence of this role was found in the hierachy of Drivers identified by the ranking of behaviors as they were associated with duration time.

The data also support the findings by Bender (1956), Ornitz and Ritvo (1968) that depressed nystagmus scores are associated with withdrawal from reality. The Be Strong Driver, which is associated

with under-processing, is manifested in such behaviors as: numb, rigid posture; monotonous voice tone; plastic facial expression; and a denial of feeling (Kahler, 1974).

A preponderance of Please Me Drivers was observed and various explanations considered. It was suggested that the Please Me Driver is an underlying Driver emanating from a basic wish to be loved.

DISCUSSIONS AND IMPLICATIONS - Parents

The measurement of nystagmus as a means of evaluating vestibular function and Driver behavior proved interesting but inconclusive.

This study did indicate there was a slight correlation between Driver behavior and duration of postrotary nystagmus. This would indicate there was some validity that basic physiology determines psychological behavior patterns.

However, several factors question the validity of this study: the sample was small; the SCPNT had not been standardized on adults but A. Jean Ayres found differences in age due to sample error rather than changes with age: and the sample proved skewed in Driver behavior.

Several explanations of the skewed sample are possible. It may be due to occupational therapist bias. Although seven mothers were available at any one time, the most approachable (i.e., with Try Hard and Please Me Drivers) would tend to be chosen. It may be a true sample of the population of Lab School since the person with Please Me or Try Hard Drivers would tend to seek information rather than avoid it. Her system operates on a high input level: to maintain equalibrium she makes sure input is high. Participating in Lab School would be one way to insure input. The skewed sample may be due to PE's bias in identifying behavior. It may also be due to researchers bias in interpreting results. Since both researchers have Please Me, Be Perfect, and Try Harder Drivers they may have projected their own meaning in analyzing the material.

Nystagamus or rapid eye movement following rotation is a normal, adaptive response designed to reestablish the original fixation on a visual field. Reduced nystagmus would suggest reduced adaptive

capacity. Excessive nystagmus would suggest over-adaptive behavior.

In this sample this proved to be true. Twenty of the thirty subjects showed excessive nystagmus and over adaptive Driver behavior. Of the fourteen who showed Driver behavior as Try Hard, eleven had excessive nystagmus and only three had normal nystagmus. Of the twelve who showed their Driver behavior as Please Me, eight had excessive nystagmus and four normal.

An implication from this observation is that persons with under adaptive capacity and Be Strong Drivers are either being overlooked in Lab School because they tend to withdraw and be non-demanding or they do not attend Lab School at all.

These researchers perceive a hierarchy of Driver behavior with Try Hard and Please Me as over adaptation to the environment, Be Perfect as normal adaptation and Hurry Up and Be Strong as under adaptations. Please Me appears to be the basic underlying Driver reflecting the basic desire to be loved.

Understanding the relationship between physiology and behavior patterns has tremendous implications for learning theory and parenting. Understanding the effects of physiology would stimulate a more mutually satisfying parent-child relationship. Parents would experience fewer feelings of guilt and frustration for they would recognize that the child was not being defiant or vengeful but simply was not able to comply with certain requests. The child would feel more lovable and acceptable when reasonable expectations were made upon him/her that she could comfortably fulfill. Parents would become more aware and accepting of their own and their mates processing systems. Such understanding would increase the communication and self esteem of all family members.

The research did reinforce the researcher's observation that parents with extremely different sensory processing systems as experiencing the most difficulty in communicating. The parent who is an over-processor sends too much information to the child who is an under-processor. Consequently, the child is overwhelmed and withdraws.

The parent who shares the same extreme processing system finds the child's behavior extremely unacceptable, and tends to reject the child with similar behavior.

A clear picture of the relationship would add to the knowledge of Learning Theory. With a better understanding of the uniqueness of each child's sensory processing system, the environment could be structured to increase learning.

RECOMMENDATIONS - Children

In response to the discussion and implications, the following recommendations are made:

1. In order to investigate the researcher bias, it is recommended that other persons knowledgable in miniscript theory analyze the same data.

2. In order to investigate Parent Educator bias, it is recommended that the initial request of the child and the response sequence be video-taped for analysis by persons knowledgeable in miniscript theory.

3. Further standardization of postrotary nystagmus duration is needed on a wider range of ages.

4. Recognition of the relationship between basic physiology (i.e., nystagmus duration) and behavior patters (Drivers) provides a useful tool for predicting behavior. Further research is needed with larger samples and more refined observation techniques to validate the predictive relationship.

5. Knowledge of nystagmus duration can be used by parents and others as a basis to provide remedial stimulation, to control the amount of input (reduce for over-processors, increase for under-processors), and, to be aware of Driver invitations they are likely to invite in their children.

RECOMMENDATIONS - Parents

The recommendations are that further research be done.

To accomplish this:

1. The SCPNT should be standardized on adults.

2. Observation techniques should be refined by:

   2.1 Video taping parents while performing written tasks;

   2.2 Having personnel, other than researcher, trained in identifying Driver behavior, review video tape;

   2.3 Having occupational therapist take the odd number parents as they arrive in the morning for the SCPNT test;

   2.4 Increasing the size of the sample to get a more valid sample and to identify the true population of Lab School.

3. Further research is vitally needed to measure nystagmus to evaluate vestibular function and Driver behavior as a means to identify the relationship of physiology and psychological behavior patterns.

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APPENDIX E

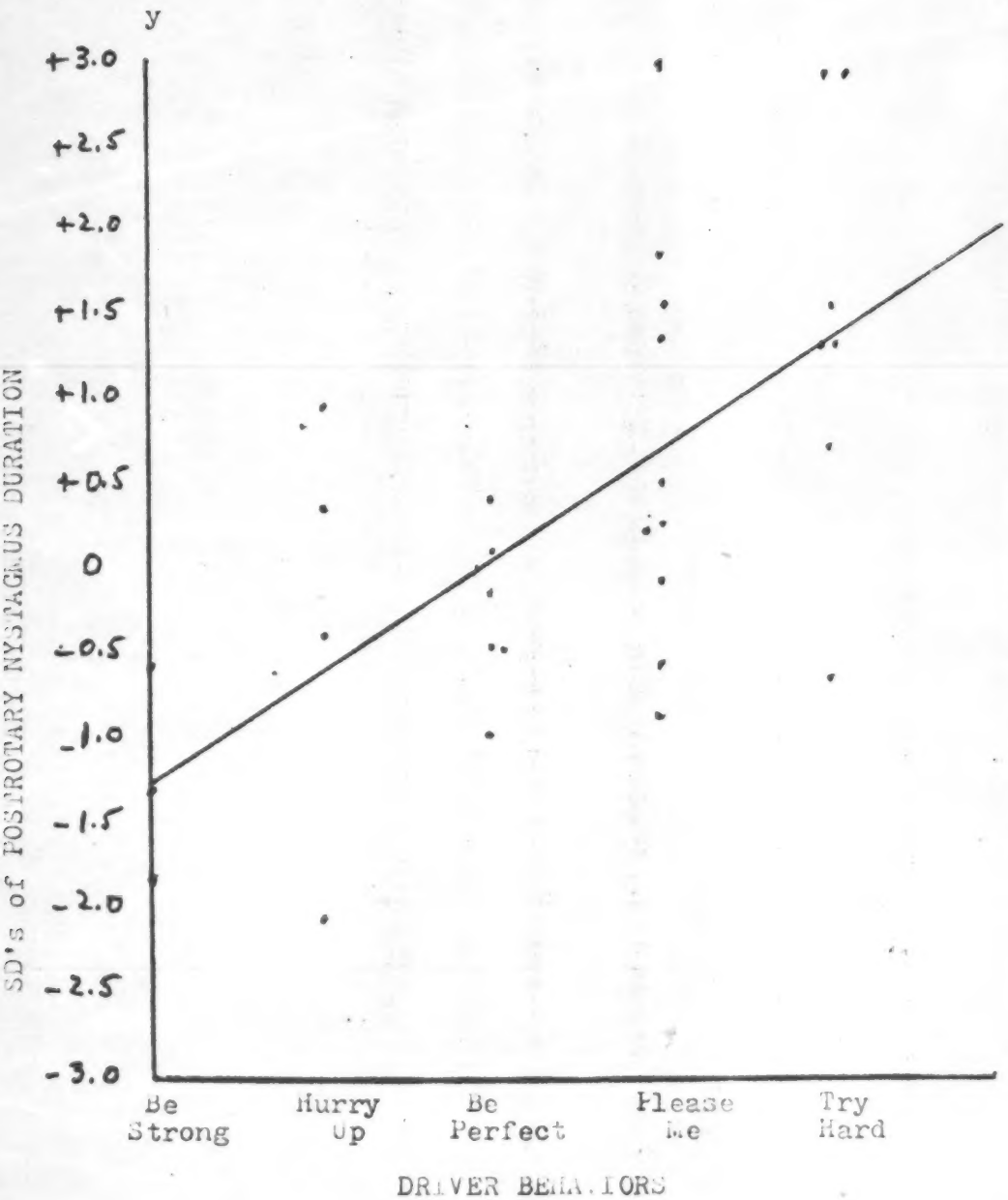
Summary of Postrotary Nystagmus Scores & Drivers for Children

Driver 1	Driver 2	Age Mo.	Sex	Duration L	Duration R	Combined Score	SD Equiv.	Avg. SD
TH	HU	54	F	10	13	23	+0.8	
TH	PM	40	F	18	25	43	+3.0	
TH	BP	56	M	16	16	32	+1.6	
TH	PM	43	M	16	14	30	+1.4	
TH	PM	45	F	21	20	41	+3.0	
TH	PM	36	F	7	7	14	-0.6	
TH	PM	48	M	14	16	30	+1.4	
N=7							9.88	+1.41
PM	BP	40	F	23	23	46	+3.0	
PM	BP	50	F	15	7	22	+0.6	
PM	BP	45	F	15	15	30	+1.9	
PM		40	F	6	9	15	-0.5	
PM	HU	55	M	12	18	30	+1.4	
PM	TH	57	F	14	14	28	+1.6	
PM	HU	59	F	6	7	13	-0.8	
PM		56	F	10	10	20	+0.3	
PM	HU	61	F	12	6	18	0.0	
PM	HU	58	M	10	12	22	+0.3	
N=10							+7.8	+0.78
BP	PM	48	F	10	10	20	+0.3	
BP	PM	59	F	3	14	17	-0.2	
BP	PM	48	F	9	6	15	-0.5	
BP		50	F	9	6	15	-0.5	
BP	PM	59	F	7	5	12	-1.0	
BP	PM	68	M	7	14	21	+0.1	
N=6							-1.32	-0.32
HU	PM	42	M	3	2	5	-2.1	
HU	PM	58	M	12	15	27	+0.9	
HU	PM	42	M	10	12	22	+0.3	
HU	PM	64	M	7	10	17	-0.4	
N=4							-1.3	-0.34
BS	PM	42	F	0	7	7	-1.8	
BS	PM	57	F	4	10	14	-0.6	
BS		36	F	5	5	10	-1.3	
N-3							-4.3	-1.43

APPENDIX F

Summary of Postrotary Nystagmus Scores and Drivers for Parents

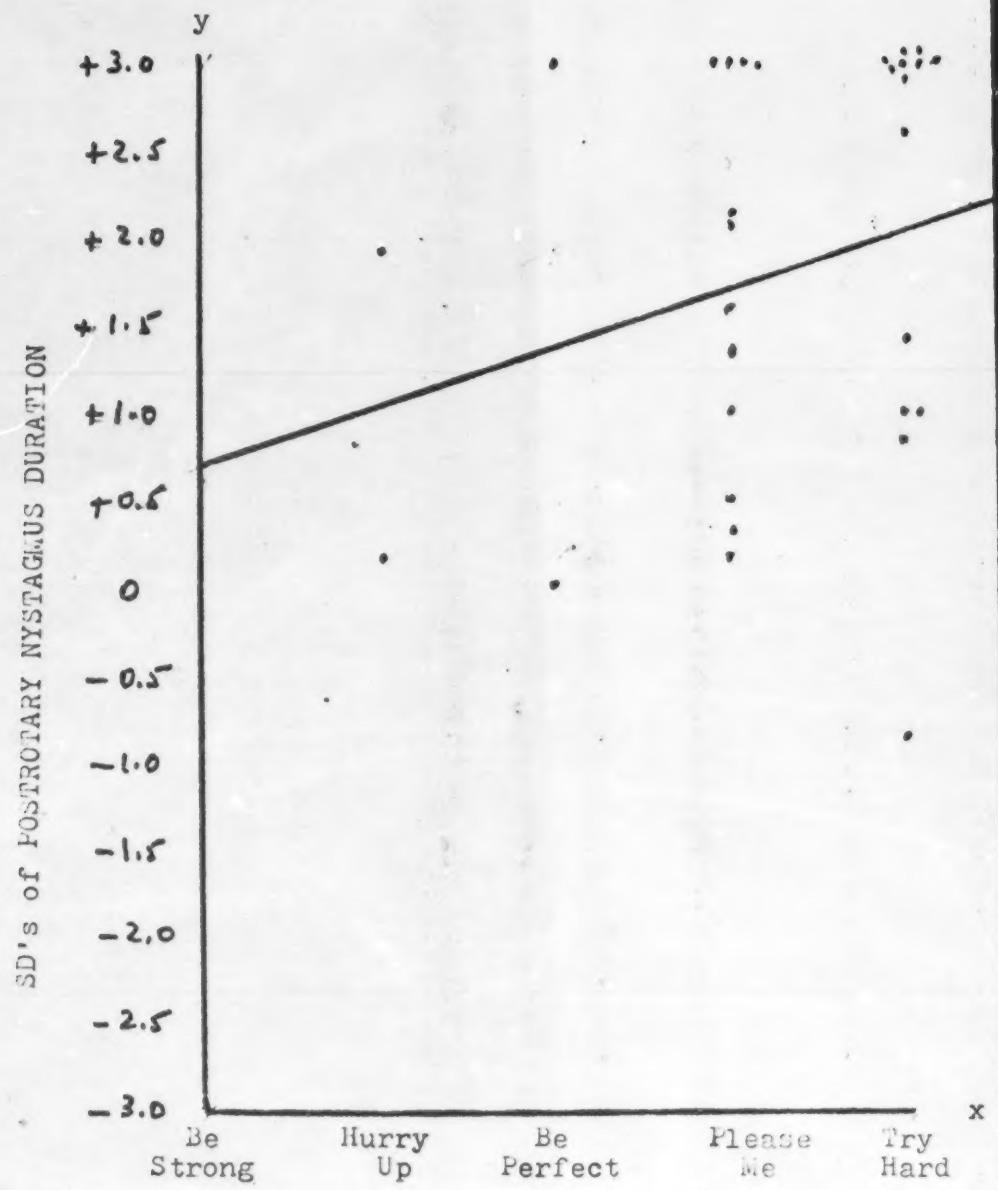
Number	Driver 1	Driver 2	Age Yrs.	Sex	Duration L	Duration R	Combined Scores	SD Equiv.	Avg. SD
1	TH	PM	29	F	23	24	47	+3.0	
2	TH	PM	31	F	13	11	24	+1.0	
3	TH	PM	35	F	28	21	49	+3.0	
4	TH	PM	36	F	26	22	48	+3.0	
5	TH	PM	30	F	25	23	48	+3.0	
6	TH	PM	30	F	15	19	34	+2.6	
7	TH	PM	28	F	34	31	65	+3.0	
8	TH	BS	28	F	15	21	36	+2.9	
9	TH	PM	23	F	6	7	13	-0.8	
10	TH	PM	38	F	23	15	38	+3.0	
11	TH	BS	33	F	28	22	50	+3.0	
12	TH	PM	32	F	12	15	27	+1.4	
13	TH	PM	26	F	11	12	28	+0.08	
14	TH	PM	31	F	13	11	24	+1.0	+2.08
15	PM	TH	29	F	16	12	28	+1.6	
16	PM	BP	31	F	30	18	48	+3.0	
17	PM	BS	41	F	18	24	42	+3.0	
18	PM	TH	27	F	15	6	21	+0.5	
19	PM	BP	28	F	11	8	19	+0.2	
20	PM	TH	29	F	20	19	39	+3.0	
21	PM	-	25	F	9	15	24	+1.0	
22	PM	TH	35	F	9	11	20	+0.3	
23	PM	TH	44	F	15	17	32	+2.2	
24	PM	TH	32	F	25	25	50	+3.0	
25	PM	TH	30	F	12	14	26	+1.3	
26	PM	TH	33	F	15	16	31	+2.1	+1.77
27	BP	PM	30	F	9	9	18	0.0	+1.5
28	BP	PM	36	F	17	20	37	+3.0	
29	HU	PM	31	F	10	9	19	+0.2	
30	HU	PM	22	F	15	15	30	+1.9	+1.5



$y = .68 x - 1.29$

$r^2 = .68$

$r = .65$



$y = .35x + .72$

$r^2 = .07$

$r = .26$

APPENDIX I

T-Test used to test hypothesis that true correlation is zero proved to be significant at the .001 level for a 2-tailed test. The fact that a relationship exists is strongly supported.

$$t = \frac{r_{xy}\sqrt{N-2}}{\sqrt{1-r^2_{xy}}}$$

$$= \frac{.65\sqrt{30-2}}{\sqrt{1-.42}}$$

$$= \frac{(.65)5.29}{.76}$$

$$= \frac{3.44}{.76}$$

$$= 4.53$$

APPENDIX J

T-Test used to test hypothesis that true correlation is zero proved to be significant at the .10 level for a 1-tailed test. The strength of this relationship is negligible.

$$t = \frac{r_{xy}\sqrt{N-2}}{\sqrt{1-r^2_{xy}}}$$

$$= \frac{(.28)\sqrt{30-2}}{\sqrt{1-.07}}$$

$$= \frac{(.28)5.29}{.96}$$

$$= \frac{1.48}{.96}$$

$$= 1.54$$